DOCUMENT RESUME

ED 358 834 IR 016 117

TITLE	Educational Telecommunications. Final Report of the NEA Special Committee on Telecommunications.
INSTITUTION	National Education Association, Washington, D.C.
PUB DATE	92
NOTE	49p.
AVAILABLE FROM	NEA Professional Library, P.O. Box 509, West Haven, CT 06516 ($15.95).
PUB TYPE	Reports - Evaluative/Feasibility (142)
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	Access to Education; Advisory Committees; *Distance Education; Educational Policy; *Educational Technology; Elementary Secondary Education; *Equal Education; Guidelines; Policy Formation; Program Implementation; School Restructuring; Teacher Certification; *Teacher Role; Technical Assistance; *Telecommunications; Training
IDENTIFIERS	*National Education Association; Regulatory Programs

ABSTRACT

In meeting its charge to investigate the role and impact of telecommunications technology on education and to make policy recommendations to the National Education Association (NEA), the NEA Special Committee on Telecommunications read and discussed numerous reports on educational applications of telecommunications and heard presentations from many interested parties. The committee agreed that teachers and other education employees are central to the success of any telecommunications project and that they must be involved at every stage if the project is to have educational value. The committee also found that distance learning networks have the capacity to reduce inequity and to be effective tools in school restructuring efforts. To improve telecommunications, the committee strongly recommended telephone service for every classroom. The need for technical assistance and training at all levels, along with sufficient preparation time for the development of effective learning strategies was recognized. It was also recommended that schools choose the system that is most appropriate for them and that no reduction of hours or compensation occur for any employee as a result of telecommunications use. States are encouraged to develop policies for licensing teachers involved in distance education. The NEA recognizes its obligation to inform members about telecommunications advances and current and proposed regulations that influence education. (Contains 27 references.) (SLD)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED358834

EDUCATIONAL TELECOMMUNICATI

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy

"PERMISSION TO REPRODUCE THIS MATERIAL IN OTHER THAN PAPER COPY HAS BEEN GRANTED BY

G. Felton

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)"

112016 117

Limited supplies of complimentary copies of this publication are available from NEA Research for state and local associations and UniServ staff. Additional copies may be purchased from the NEA Professional Library, P.O. Box 509, West Haven, CT 06516. Telephone 1-800-229-4200 for price information.

REPRODUCTION: No part of this report may be reproduced in any form without written permission from NEA-affiliated associations. Any reproduction of the report materials must include the usual credit line. Address communications to Editor, NEA Research.

Copyright © 1992 by the
National Education Association
All Rights Reserved

Educational Telecommunications

Contents

3 **Summary**

5 **Introduction**

9 **Overview**

10 Applications of Telecommunications Technology
14 Transmission Systems

17 **Issues and Conclusions**

17 General Principles
19 Equity Issues
20 Process Issues
22 Professional Issues
26 Association Issues
27 Working Conditions
30 Restructuring Issues
32 Resources
33 Regulatory Issues
36 A Concluding Note

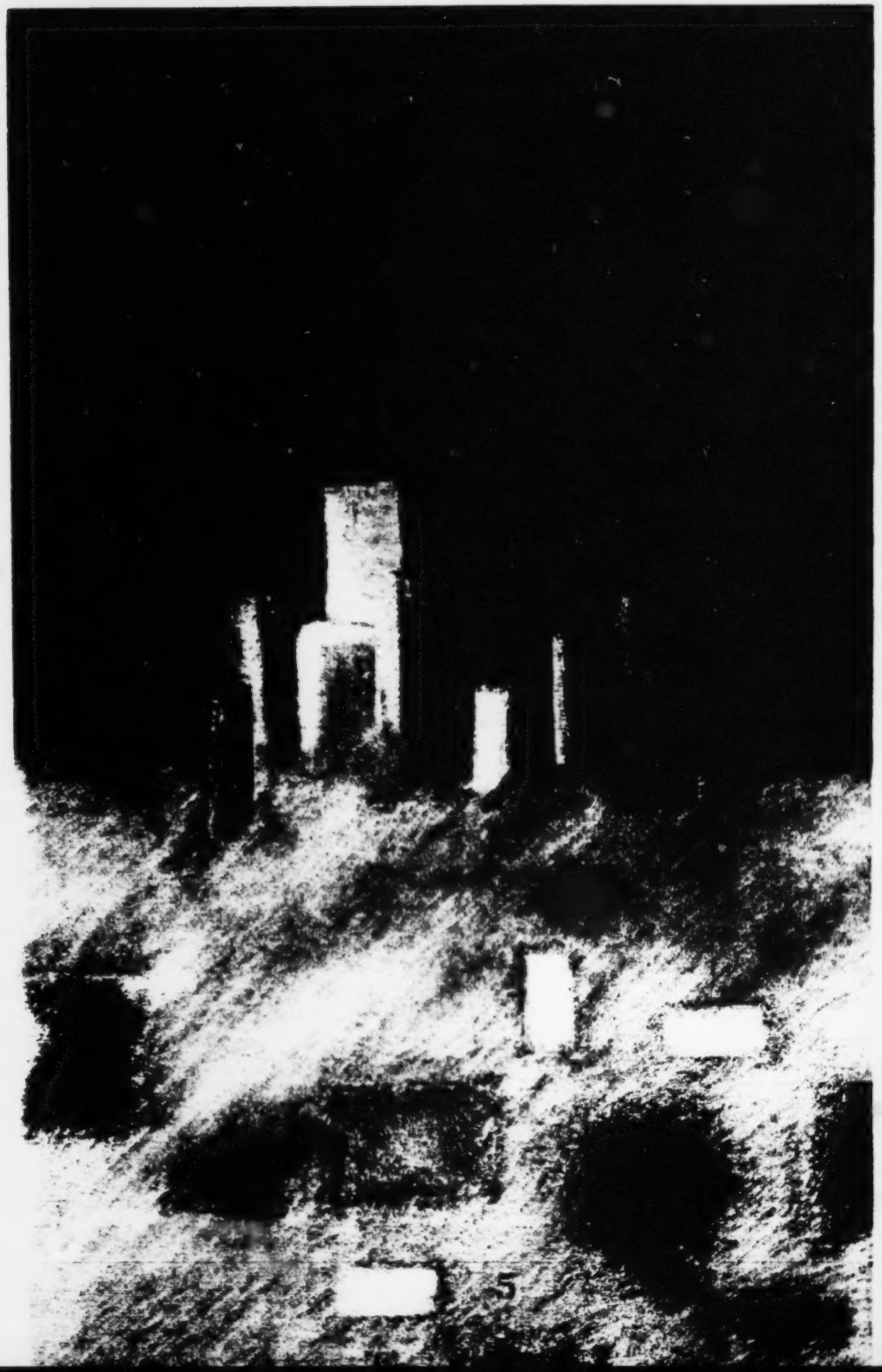
38 **Policy Positions**

40 **Action Recommendations**

42 **References**

44 **Appendix. Presenters**

Committee Members


5

Summary

Telecommunications technology is transforming the way education is being organized and delivered in many school systems throughout the United States. In meeting its charge—to investigate the role and impact of telecommunications technology on education and make policy recommendations to the National Education Association (NEA), the NEA Special Committee on Telecommunications read and discussed numerous reports on educational applications of telecommunications and heard presentations from representatives of commercial and publicly supported distance learning networks; teacher/users; government officials; public interest advocates; cable, satellite, and telephone-related infrastructure providers; and local and national association staff members.

The committee overwhelmingly agreed that teachers and other education employees are central to the success of any telecommunications project and must be involved in every stage—planning, design, curricular objectives, equipment selection, staffing, implementation, evaluation, and future policy direction—if the project is to have any educational value.

The committee found that distance learning networks, which can broaden the horizons of both teachers and students through course offerings and educational enhancement programs, have the capacity to reduce inequities and to be effective tools in school restructuring efforts. To further develop the ties between the school and the community that are basic to successful restructuring as well as to permit access to the growing

world of electronic bulletin boards and on-line databases, the committee strongly recommended telephone service for every classroom.

Noting the tendency of school systems to fund the acquisition of equipment and neglect the ongoing provision of training and maintenance, the committee emphasized the need for both technical assistance and compensated training at all levels coupled with sufficient preparation time for the development of effective learning strategies.

Although the committee found no evidence to date that education employees have been replaced by telecommunications technology, it recommended that a policy of no direct or indirect reduction of positions, hours, or compensation be a part of any telecommunications project. Agreeing that there is no one best model for the use of telecommunications technology, the committee recommended that schools choose the system that is most appropriate for them and that participation on the part of education employees be voluntary and based on skills as well as seniority.

The committee recommended that states be encouraged to develop specific policies for licensing teachers involved in distance education and that standards and policies regarding facilitators in telecommunications projects be developed by the district and the local association.

The committee concluded that telecommunications providers should have the opportunity to develop, produce, and distribute products and services relevant to public education and that NEA and its state affiliates have a responsibility to inform their members concerning current telecommunications regulations and the impact of proposed regulation changes on the accessibility and affordability of telecommunications technologies. Further, the NEA and its affiliates should work with appropriate agencies and government bodies to secure low-cost access to telecommunications services for schools and classrooms.

Introduction

This is a time of enormous change both in the telecommunications industry and in the applications of telecommunications technology to education. Because of the growing importance of educational telecommunications to NEA members' professional practice and working conditions, the 1990 NEA Representative Assembly voted to create a Special Committee on Telecommunications and assigned it the following charge:

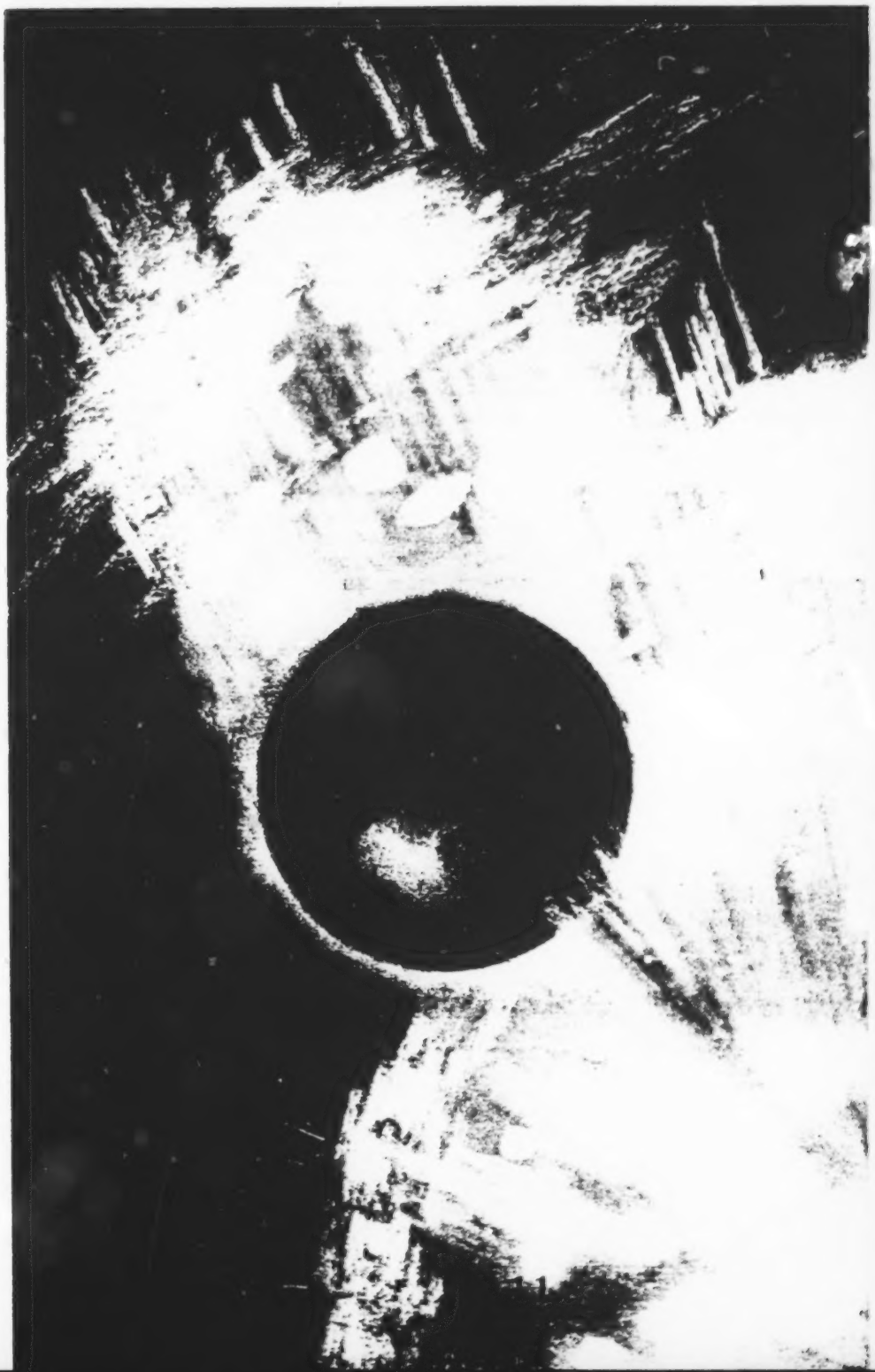
To investigate the role and impact of telecommunications technology on education and make policy recommendations to the Representative Assembly.

During the past two years, the Special Committee on Telecommunications has reviewed available literature on educational applications of telecommunications, telecommunications technology, and the regulation of the telecommunications industry. It has heard presentations from a variety of experts from educational telecommunications networks, cable companies, the U.S. Congress Office of Technology Assessment (OTA), Regional Bell Operating Companies, consumer groups, and state and national staff with experience in the field of telecommunications. These individuals are listed in the appendix.

Over the two-year period, the committee has received reports and information on a variety of excellent programs and activities in progress in school systems across the country, several of which are summarized in this report.

This report is divided into four principal sections. The first provides an overview of the field of educational telecommunications and discusses some new technologies that are likely to expand the influence of telecommunications technology in classrooms. The second section examines problems and issues of concern to educators, their organizations, and the education community. The third section sets forth proposed policy positions for the National Education Association. The fourth section contains the recommendations of the committee.

Considerable diversity exists in the types of telecommunications projects currently being implemented. The number of issues raised by the diversity of projects is compounded by the complexity of the technical and regulatory issues that undergird contemporary telecommunications. Because of the enormous number of potential types of situations in educational telecommunications, it was necessary to create a broad framework of policy positions that would be applicable to a wide variety of situations. The issues and the committee's conclusions are discussed under the following areas: general principles, equity issues, professional issues, issues related to working conditions, restructuring issues, equipment issues, and regulatory issues.



Overview

In the images we hold of American education, none is as prominent as the self-contained classroom. The classroom is an island on which a teacher, a group of students, standardized textbooks, and other limited resources determine the educational process. From time to time, the teachers and students make forays into the world outside to do research or take field trips to relevant sites. On the whole, though, the educational process is focused inward on the resources that exist within the classroom and the activities that occur there.

The use of telecommunications technology in classrooms literally inverts the typical locus of educational activities. Classrooms face the world outside rather than the world inside. Instead of islands, classrooms have become links in communications highways transmitting data, video, and voice to thousands of other sites. Teachers and students have easy access to vast databases and participate in joint activities that involve classes in other states and countries by traveling on these highways.

Applications of Telecommunications Technology

Telecommunications and Classrooms— Today, telecommunications technologies support a variety of educational activities. Students have used teleconferencing technology to interview scientists, government officials, and rock stars. They have taken electronic field trips to places as diverse as France, Russia, and museums located within their own states. Some of the most spectacular of the field trips have been via the *Jason Project*. In the first *Jason Project*, a remote-controlled robot vessel called Jason traveled over the floor of the Mediterranean, transmitting images of the ocean and sunken artifacts to high school students in the United States and Canada via satellite. Dr. Robert Ballard of the Woods Hole Oceanographic Institute and the expedition crew provided live commentary on the ocean environment being explored and answered students' questions through the same satellite link. Students were able to more fully appreciate the broadcasts because of a special curriculum spanning oceanography, the physical sciences, biology, history, geography, and telecommunications technology that was developed specifically for the Project (Office of Technology Assessment 1989).

More recently, the *Jason Project* moved to the Galapagos Islands. Broadcasts of undersea and land life in these extraordinary islands were transmitted live to American students in schools and museums through satellite and cable networks. Selected teachers had the use of an interactive facsimile service, which allowed them to receive the project's curriculum materials on demand (Peter Grunwald, personal communication, January 1992).

Telecommunications technologies are also used to link classrooms with one another. In *World 2000*, a senior high school in Juneau, Alaska, is engaged in a collaborative project with a class in the Babushinski District of Moscow. The students use a combination of mail and computer conferencing to share research and writing on global health issues. Ultimately, participants in the project will develop a shared understanding of the world's health in the year 2000 (National Foundation for the Improvement of Education 1990).

In *Reaching Out around the World*, students at Brown Point School in Tacoma, Washington, collaborate in research and writing projects via satellite with students at Collingwood Intermediate School in Invercargill, New Zealand. Among other things, the students have produced a "Declaration for the 21st Century," which was presented to the United Nations Conference on Children in 1990. The students catalogued a number of critical problems, including environmental pollution, AIDS, the depletion of the ozone layer, and drift net

fishing. In their declaration, they urged world leaders to address these issues (Dick Turnbull, personal communication, October 1990).

In the AT&T *Learning Network*, groups of 7 to 10 classrooms constitute learning circles, which form the basic units of collaborative research and interstate and international information sharing. A teacher from Lake Charles, Louisiana, sent the following message about the *Learning Network* to the NEA Special Committee on Telecommunications via electronic mail:

> **In our efforts to move toward total school restructuring at Fairview Elementary, telecommunication, particularly the AT&T *Learning Network*, has become an integral part of the curriculum. It has served as the foundation for the development of interdisciplinary units. Electronic messages from Coober Pedy, South Australia, have unveiled explorations into aborigine cave art, homes built underground, and studies of the southern hemisphere. The interest of a class in Hilton, New York, in Mardi Gras has spurred in-depth research of our own Louisiana heritage. (Diane Mason, personal communication, February 3, 1991)**

We are witnessing the birth of new learning communities, which are defined by telecommunications links and not by the space in which they exist. They permit a level of geographic and cultural diversity in education that could only have been imagined previously. In these new communities, the roles of teachers and students are undergoing dramatic redefinition. Teachers have moved from center stage to concentrate more and more on overall coordination, planning, the organization of learning opportunities, and the mentoring of individuals and small groups of students. At the same time, students have considerably more freedom to define their activities, choose the direction of their research, and collaborate with their peers in their own and other classrooms. The use of telecommunication technology redefines teacher and student roles and plays a major role in efforts to restructure American schools.

The Massachusetts Corporation for Educational Telecommunications (MCET) has made restructuring an explicit feature of *Reach for the Stars*, an MCET project designed to improve the teaching of science in middle schools. Teachers at the 59 geographically diverse demonstration sites in the project have become instructional designers, working with MCET to develop science programs that combine student-directed learning with multiple technologies and a variety of information sources and pedagogical styles. To help teachers make the transition to more active and flexible educational environ-

ments, MCET trains the teachers in the use of various technologies, teaching strategies, and science skills through interactive courses using satellites and computer conferencing. Technologies employed in *Reach for the Stars* include interactive satellite transmissions, laser videodiscs, computer networking, telecommunications-based curriculum offerings, hands-on science materials, videotapes, and facsimile machines (Ahern 1991). The project received $4.9 million in fiscal year 1990 and $4.76 million in fiscal year 1991 from the U.S. Dept. of Education's Star Schools program (Krebs 1991).

In addition to restructuring, telecommunications technology has the potential to make vast improvements in available educational resources. The inclusion of on-line databases like Dialog, CompuServ, and Prodigy in media centers and classrooms puts enormous research capacity at the fingertips of teachers and students. Comprehensive databases on scientific research, the social sciences, finance, and current affairs can be accessed almost instantaneously. SCOLA, a satellite-based news service (also available to cable systems), brings foreign TV news programming in 20 languages from 30 countries into schools.

Educational programming over cable networks was given a boost with the formation of Cable in the Classroom, a nonprofit service of the Cable Alliance for Education. Cable in the Classroom functions as a clearinghouse of information on educational programming offered by 30 cable distributors, which serve over two-thirds of the national cable television audience, and 19 cable programmers who have designated educational programs available for classroom use. Program members offer curriculum-based support materials as well as copyright clearances that allow teachers to replay programs on videotape. The large distributors among its members have agreed to provide free installation and basic service by 1992 to all junior and senior high schools that currently lack service.

Cable programs such as the Discovery Channel's *Assignment Discovery* bring broadcasts on topics ranging from science and technology to social studies and contemporary issues into classrooms and media centers. The Cable News Network's *Newsroom* is a 15-minute, commercial-free, cable-delivered news program offered free of charge to middle and secondary schools each day. The Discovery Channel and CNN are members of Cable in the Classroom.

Courses delivered at a distance over a number of telecommunication platforms serve as important resources for the curriculum of many school districts. Growth in distance education has occurred in both kindergarten through twelfth grade (K-12) and higher education. In the K-12 context, there is special emphasis on courses in foreign languages, the sci-

ences, and mathematics, but courses in the humanities, social sciences, business, and vocational education are also broadcast (OTA 1989). Networks range in size from relatively small districtwide networks to TI-IN, a national satellite-based educational network, which broadcasts whole courses, student enrichment programs, and professional development programs into 1,000 school districts in 29 states (*Tech Trends* 1991).

Distance education has been of particular benefit to rural communities that suffer from low demand for particular courses, difficulty in meeting state-mandated curriculum requirements, and problems in attracting teachers in specific areas of the curriculum. However, it is also employed in urban areas such as Prince George's County, Maryland, where interactive television has been used as a solution for both insufficient enrollment and the lack of specialized teachers (Schiller and Noll 1991). An excellent source of information on distance education courses is the on-line database of the National Distance Learning Center in Owensboro, Kentucky.[1]

Until recently, distance education has concentrated only on meeting specialized needs or filling gaps in the curriculum. This may be changing. Educational networks are beginning to explore the possibility of working with classroom teachers as partners rather than as the sole source of instructional delivery (Gary Vance, personal communication, November 1991). This would give the networks a much larger market as well as permit them to explore more innovative programming.

TELECOMMUNICATIONS IN HIGHER EDUCATION— According to the *Wall Street Journal*, the number of colleges and university students enrolled in distance education is in the high six figures nationally. Courses might be interactive satellite courses with two-way audio hook-ups, interactive audiographics courses (which employ two-way audio hook-ups, computer graphics, and, possibly, electronic writing tablets), or prerecorded video telecourses. The Annenberg/Corporation for Public Broadcasting Project's prerecorded telecourses are used at 2,000 institutions of higher education as well as broadcast over cable and public television (Graham 1991).

---

[1] The National Distance Learning Center can be reached on-line at (502) 686-4555, by telephone at (502) 686-4556, or facsimile at (502) 686-4558. If you are trying to connect to the Center's on-line database, configure your communications software with normal N-8-1 settings, choose a fixed connection speed of up to 2400 baud, and configure your software to emulate a VT-100 terminal. There is no connect charge to the database. You have to pay long-distance telephone charges, however.

One of the reasons for the growth of distance education in higher education is the changing nature of work and society. In many cases, people who take distance education courses are working adults who have busy schedules that preclude their taking classes during regularly scheduled times or they live so far away from any college or university that they would have to move to attend school.

Teacher Education and Professional Development— Some of the beneficiaries of this new trend have been teachers. In one story about the Mind Extension University, a school psychologist took three education courses that were carried over his local cable system. A nearby community in which two other teachers lived did not carry ME/U programming. With the permission of the local cable company, the psychologist videotaped the programs and shared them with his friends so that they could also take the course (Jones 1991).

In addition to being able to take courses at home, teachers may benefit from programming provided by educational networks. For example, *Teacher TV,* a weekly 30-minute broadcast co-produced by NEA and The Learning Channel, contains information on school restructuring efforts around the country and ideas for teachers to use in their own classrooms. TI-IN carries over 200 hours of professional development programming per year. Teachers have the opportunity to see broadcasts of well-known figures in education discussing contemporary issues. If the broadcasts occur at an inconvenient time, they can be videotaped and viewed later. Some networks provide specialized training to teachers who receive their broadcasts. Next year, for example, MCET is planning to do a statewide professional development workshop for teachers in Massachusetts on portfolio assessment.

One of the most compelling advantages of telecommunications technology for teachers, however, is its ability to link teachers with one another and with research institutions. The *School Renewal Network* links the NEA's Learning Labs and Mastery in Learning Project schools with each other and with educational researchers. The multi-conference bulletin board allows participants to exchange information and discuss issues related to school restructuring, technology, and a variety of other topics.

Transmission Systems

The telecommunications infrastructure used to deliver programs and information to schools and institutions of higher education includes satellites, coaxial cable systems, the telephone system, fiber optics systems, Instructional Television

Fixed Service (ITFS), microwave, computers, and broadcast media. Often the delivery system of educational networks is a hybrid of several of the delivery systems mentioned above (Roberts 1991).

Fiber Optic Networks— Some of new technologies are likely to have a profound impact on the capacity and perhaps the affordability of telecommunications systems. In fiber optic systems, signals are transmitted by light waves rather than electrical impulses. Many more times the information, whether video, voice, or data, can be transmitted over fiber optic networks than networks of copper cable. A single strand of fiber can transmit up to 100 channels of conventional television (Daley 1991a). Because of the large amount of information that can be transmitted over them, fiber optic networks are called broadband networks.

Broadband fiber optic networks are already being used in education. Mississippi 2000 is a public/private partnership involving the state of Mississippi, South Central Bell, Northern Telecom, ADC Telecommunications, IBM, and Apple Computer. In this project, a public fiber optic network links secondary schools in Clarksdale, Philadelphia, Corinth, and West Point with the Mississippi State University in Starkville, the University for Women in Columbus, and the Mississippi Educational Television Network studio in Jackson, Mississippi (Northern Telecom 1991; Mississippi 2000 news release, March 6, 1991).

To add new programs and preserve special curriculum offerings in the face of declining enrollments, Bergen County, New Jersey, signed a 10-year, $4.7 million contract with New Jersey Bell to install and maintain a fiber-based interactive network that will connect 44 secondary schools, Ramapo Community College, and Bergen Community College by 1995. Currently, 14 secondary schools and the two community colleges use the network (Daley 1991b).

Fiber optic networks permit the flawless transmission of a course to many locations at once as well as permit the instructor to send different kinds of materials (including multimedia presentations) to receiving sites. Some technical development remains to be done and some regulatory issues still have to be worked out before fiber optic technology is available to schools on a mass scale, but its use in education is likely to increase in a limited number of sites in the meantime.

Direct Broadcast Satellite— Another new technology that may soon be used to broadcast educational programs is the digital, direct broadcast satellite. Advanced Communications Corporation (ACC) is in the process of building two high-

power direct broadcast satellites, which will offer educational programming as well as entertainment, news, and other services. The orbital positions granted to ACC by the Federal Communications Commission permit simultaneous coverage of all 50 states and Puerto Rico. Two transponders on each satellite will be provided to the Foundation for Educational Advancement, which will establish the YES (Your Educational Services) Network to create and distribute educational programming. The satellites will be capable of broadcasting full-motion video, high-definition television, electronic text, computer software, and digitally recorded music. A microprocessor in the receiving dish will direct the storage of satellite materials and permit the user to view or download educational programs or computer software at a convenient time. Each transponder will be able to deliver up to 100 channels of information. The Foundation plans to provide a free 15- to 18-inch receiving dish (the high power permits smaller dishes than conventional satellites) to all schools and libraries around the country. A modest annual fee will be charged to each site to receive the programs, however (Ashford 1990; West 1990; *The Heller Report* 1991; *Communications Daily* 1990; Garner 1991).

Very Small Aperture Terminal— In the fall of 1992, the Public Broadcasting Service is beginning pilot tests of Very Small Aperture Terminal (VSAT) technology. VSAT technology uses a very narrow bandwidth portion of a satellite to provide two-way digital data. In the tests, schools will have access to databases, interactive distance learning courses, electronic mail, information for teachers about PBS programs, and interactive training for teachers. The equipment will allow teachers to talk and share materials with other teachers as well as permit classes in diverse geographical locations to work together. The pilot tests will help PBS stations prepare for the transfer of its service to a new satellite in 1993. PBS plans to put a satellite dish and VSAT technology at 194 stations. The technology will allow the stations to send back data, voice, and limited video (Bocke 1991; Project VSAT news release, November 18, 1991).

Clearly, we are on the verge of significant growth in educational telecommunications. The participants in the wave of change are the federal government, state and local governments, the cable companies, the phone companies, computer companies, manufacturers of telecommunications equipment, school districts, and institutions of higher education, to name some of the most visible. Many of us will soon find ourselves in the position of participating in and evaluating telecommunications-based projects.

Issues and Conclusions

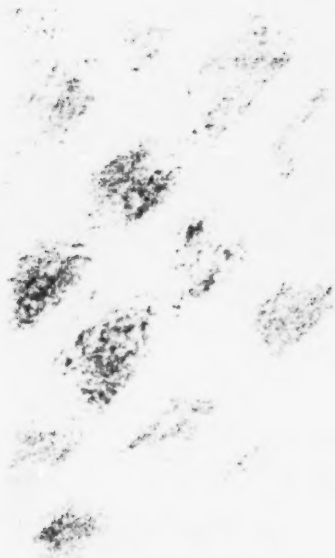
In spite of its potential, the advent of telecommunications as an educational tool poses an array of issues that confront practitioners, their organizations, and the education community. The Special Committee on Telecommunications identified issues in several areas and reached conclusions in the form of policy positions and/or recommendations on those issues.

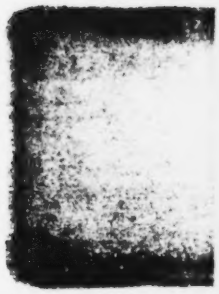
General Principles

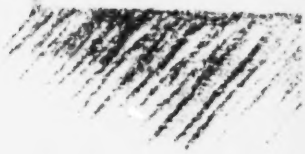
Role of Education Employees— Education employees play critical roles with respect to the introduction and use of telecommunications technology in schools.[1] They are planners, problem solvers, designers, coordinators, technicians, researchers, and evaluators. Most importantly, they are among the primary users of every existing telecommunications system. Their perspectives, insights, support, and commitment to the use of the technology are vital for the successful implementation of telecommunications technology.

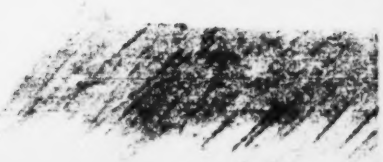
Conclusion: *Education employees should be represented on committees and in groups making decisions with respect to telecommunications. The local education association should be an active participant in the decisionmaking process. Education employees are essential to the success of any telecommunications project.*

[1] Unless otherwise indicated by the context, the use of the term *school* is intended to include institutions of higher education as well as K-12 schools.









Curriculum Enhancement— A growing number of schools in the United States and overseas use telecommunications technology in instruction. The uses to which telecommunications technology have been put have led to the creation of new learning environments with new demands on teachers and students, the development of alternative teaching and learning strategies, and the growth of new communities of learners (geographically separated but electronically connected). The technology is both a new tool for teachers and a means by which scarce educational resources can be shared.

> Conclusion: *Telecommunications technology is an effective tool to enhance the curriculum and support the restructuring of schools.*

Choice of Telecommunications Systems— There is a wide variety of possible uses for telecommunications technology. There is also a wide variety of delivery systems. The particular use to which the equipment is put and the type of delivery system chosen should be driven by the specific educational needs of the school, the resources to which it has access, and its financial capacity. Many systems are hybrids of several delivery systems. The best system is one that meets a school's or school system's needs, is affordable, and allows room for change and growth.

> Conclusion: *No one best model exists for the use of telecommunications technology. Schools must choose the system that is most appropriate for them.*

Equity Issues

Access to Enrichment Opportunities— It is often not possible for geographically isolated or small districts to afford the array of educational courses and programs available to larger or wealthier districts. Using telecommunications technologies, school districts have been able to provide courses and enrichment programs to students who would otherwise be denied access. In recognition of the problems of many smaller, geographically remote districts, the federal government's Star Schools program has explicitly focused on the provision of courses in mathematics, science, and foreign languages to small or remote schools through satellite and other distance learning technologies.

Even within districts, educational opportunities can vary considerably. In Prince George's County, Maryland, the school district operates an interactive television network that brings advanced placement courses to six schools with predominantly minority populations. Minority enrollment in

advanced placement courses on the interactive television network is 86 percent of total advanced placement enrollment compared to 38 percent minority enrollment in advanced placement courses systemwide (Schiller and Noll 1991). According to the system's director, many of the students taking classes over the interactive television network would not have access to the courses through other means.

> CONCLUSION: *Telecommunications technology has the capacity to reduce educational inequities within and among schools and school districts.*

FUNDING EQUITY— Telecommunications technology can connect schools and classrooms with a dizzying array of on-line databases, educational courses and programs, professional development opportunities, and potential partners for collaborative educational projects. The inequity that exists when one school has newer or better textbooks than another is magnified many times in the case of telecommunications haves and have-nots.

> CONCLUSION: *The NEA should encourage the development of public and private funding to allow schools to purchase, maintain, and upgrade telecommunications systems and connections.*

Process Issues

EMPLOYEE INVOLVEMENT— Employee involvement in planning ensures that, first, the distance education effort is educationally appropriate for the needs of the school and school district. Second, employee involvement contributes to the determination of realistic staffing practices relative to the distance education effort. A distance education effort which places onerous demands upon its staff risks certain failure. Third, employee involvement leads to the development of effective instructional strategies for distance education. Finally, employee involvement in a project's planning phase is more likely to generate the buy-in of the staff as a whole. Larry Cuban in *Teachers and Machines* points out that teachers act as gatekeepers with respect to what comes into the classroom and how available learning resources are used (Cuban 1986). Without the buy-in of the staff, distance learning efforts are not likely to take hold within schools. In support of the notion of the need for a staff to buy into distance education, the Office of Technology Assessment's Linda Roberts told the committee that one of the characteristics of a successful program is a cooperative effort among all interested parties (Roberts 1991).

Employee involvement in evaluation of the system is also important. While the educational benefits of distance education are perhaps the most critical aspect of the evaluation effort, problems resulting from staffing levels, logistical problems, and specific design issues that staff would be aware of might be overlooked if they were excluded from the evaluative effort.

Because a number of the issues that are likely to be generated in connection with a distance education effort concern contractual provisions, at least some of the employee representatives involved in the planning and evaluation processes should be appointed by the local association.

> CONCLUSION: *Education employees, including representatives of the local association, must be involved in all aspects of telecommunications projects.*

FUNDING THE TOTAL SYSTEM— In becoming involved in projects using new technologies, many school districts often spend the lion's share of available funds on equipment and neglect to set aside adequate funds for operating expenses and staff development needs. This may create frustration on the part of poorly trained staff, turn minor breakdowns into major interruptions of the curriculum, or lead to the "burn out" of overextended staff members. For long-term success, the budgeting process must consider all aspects of a system's operation.

Every school should either have a trained staff person to operate and repair equipment or easy access to such a person. Beyond technical support, distance education programs have special logistical considerations, such as the distribution of materials, that may require additional funding.

> CONCLUSION: *Maintenance, technical support, training, evaluation, and staffing, as well as equipment purchases, must be fully funded.*

ASSIGNMENT OF STAFF— A number of the individuals who made presentations to the committee identified the characteristics of good teachers in a telecommunications environment. Beyond good teaching skills in conventional classrooms, teachers in environments rich in telecommunications technology must be flexible and willing to experiment. In the case of interactive television courses, teachers need to have a strong presence on camera.

In addition, participation should be voluntary. Telecommunications projects may make additional demands on teachers and other staff involved in the effort. If staff members are not interested and willing participants, the extra demands will not be met.

CONCLUSION: *Participants in projects involving telecommunications technologies should be recruited on the basis of skills identified as necessary for success as well as seniority. Participation should be voluntary.*

Professional Issues

LICENSURE OF DISTANCE LEARNING TEACHERS— According to Noreen Huante, TI-IN's Manager of Program Services, 18 states (Arkansas, Florida, Idaho, Illinois, Indiana, Kansas, Louisiana, Maryland, Minnesota, New Hampshire, North Dakota, Oklahoma, Oregon, Pennsylvania, South Carolina, Tennessee, Utah, and Vermont) require that the distance learning teachers be licensed/certified only in the state in which the programming originates. Florida, Oklahoma, and Oregon approve the curriculum, not the teachers (personal communication, October 1991).

Many state licensing agencies have no specific policies for distance learning because they do not know what it is or have not considered it as a special problem. Therefore, distance learning teachers must follow the same path for licensure that regular classroom teachers follow. This has created a number of interesting situations. California, Washington, Nevada, and Colorado require distance educators to have fingerprint checks. California and Washington require criminal history checks in addition to the fingerprint checks. Distance education networks must pay the extra fees for the fingerprint and criminal history checks above the fees required for the state license. Some states require that distance educators take special courses in, for example, exceptional learning or human relations. New York requires a child abuse course. In Arizona, Wyoming, and Nevada, all teachers (including distance educators) must take an examination on the state constitution, which is administered by the states themselves (and almost always administered only within the states themselves).

TI-IN is the only national network to seek to license its teachers in the states to which it broadcasts its courses. Other networks have handled the licensure problem in other ways. The Midlands Consortium (a Star Schools grantee, which has now ceased to exist as a functioning unit), whose courses were broadcast from Oklahoma State University, had non-licensed instructors teaching courses and classroom teachers who were licensed (but not necessarily in the subject being broadcast) serving as facilitators. The Satellite Education Resources Consortium (SERC) broadcasts in 23 states. SERC has persuaded the Chief State School Officers (CSSOs) in each of the states to recognize the credentials of the educators who are used by the network. The CSSOs, in turn, have secured permission

from the state boards of education to accept the credentials of these teachers (Welch 1991).

To reduce the need for emergency certificates and other expedient solutions, states or groups of states might consider the adoption of specific policies for licensing distance educators. One of the problems here is that state licensing agencies have had only limited reason in the past to talk with one another about licensing requirements. Distance education highlights the insularity in which licensing requirements have historically been determined. As distance education continues to grow, there will be mounting pressure on states to adopt criteria that will make licenses more portable; however, the educational requirements for licensure should not be compromised.

In addition, because distance education requirements typically involve new competencies not now considered in granting teaching licenses, the committee believes that the NEA should encourage the licensing agencies of states involved in distance education and experts in the field to establish competency standards in the field. These standards could then be shared with school districts to be used as a basis for the selection of distance educators.

> CONCLUSION: *States should be encouraged to develop specific policies for licensing teachers involved in distance education.*

DISTANCE LEARNING FACILITATORS— In situations in which facilitators are working in courses with teachers who are not licensed in that state, facilitators may be designated as the teachers of record. These facilitators must be licensed teachers. Often, however, they are not licensed in the subject area being taught. Licensed teachers also serve as facilitators in GMI Institute's *Tune-In Math and Science* and in a limited number of other networks where there is the expectation that teachers will be able to develop sufficient skills and knowledge by taking the course along with their students and modeling the teaching behaviors of the distance educator so they will be able to teach the courses themselves the next time around.

In situations where the distance teacher is licensed and there is no expectation that the facilitator will one day teach the course being transmitted into a classroom, facilitators may or may not be licensed teachers. In class, facilitators in these situations typically perform such support tasks as turning on and shutting off the equipment, fixing minor problems, calling trained technical help to fix major problems, distributing materials, monitoring examinations, managing classroom behavior, and telling the teacher if any unusual problems develop among students in the class. The required credentials of the facilitator in these situations should be determined bilaterally

between the school district and the local association with appropriate regard for relevant state policies on the issue.

> CONCLUSION: *Standards and policies regarding facilitators in telecommunications projects should be developed by the district and local association.*

TRAINING FOR TELETEACHERS AND FACILITATORS— Whatever kind of distance education effort is attempted (the delivery of whole courses at a distance, computer conferencing, or video-conferencing with other classes around the country or world), teleteachers will have to know how to operate the equipment they are using as well as what instructional strategies may be necessary in the new classroom environments. Stimulating group research and coordinating the exchange of information among a number of remote sites using a computer bulletin board will require new skills for a number of teachers. In delivering whole courses via satellite or coaxial cable, teachers need to know how, for example, to generate a high degree of interactivity among receiving sites (among students and with the teacher), how to stimulate peer interaction at each of the sites, how to plan and organize a course delivered at a distance, and how to make the most effective use of the camera to communicate information. According to the seven case studies cited in *Linking for Learning* (OTA 1989), almost two-thirds of all teachers involved in the various projects had received no training prior to teaching in their respective distance education systems.

Facilitators involved in the delivery of whole courses must also be trained in the use of the equipment, procedures for distributing materials, and protocols for working with teachers. It has been stressed in the literature that a good relationship between the teacher and facilitators has beneficial effects for the class (Gilcher and Johnstone 1988).

> CONCLUSION: *Compensated training should be provided for teachers and facilitators in the use of telecommunications equipment, the development of effective materials, and appropriate instructional strategies.*

TRAINING FOR PROSPECTIVE TEACHERS— The record of schools of education in training prospective teachers in the use of technology in general and telecommunications technology in particular is not very encouraging. According to *Linking for Learning*, only 37 percent of teacher training institutions surveyed offered instruction in the use of interactive television for instruction (OTA 1989). Only 26 percent offered similar instruction in the use of audio technologies, and fewer than 20 percent of all institutions surveyed required this instruction of

its students. Another area in which teacher preparation seems to be lacking is in the integration of telecommunications and computer technologies. Both in the delivery of whole courses and in enrichment efforts, learning can be considerably enhanced by combining telecommunications technologies with materials designed to be used with in-class personal computers. A restructuring of teacher education in this area is critical.

> CONCLUSION: *Prospective teachers should receive training in telecommunications technology and the instructional strategies to be employed in its use.*

CONTINUING EDUCATION OF STAFF— In a number of ways, education employees can benefit professionally from the use of telecommunications technology. For example, education support personnel can participate in inservice training programs originating in one location but delivered directly to them at their job site, and teachers can get postgraduate credits from courses delivered directly to them at their schools.

Bulletin boards such as NEA's School Renewal Network encourage participants to exchange information on a variety of topics including school restructuring. Informal computer conferencing may also serve as a vehicle to encourage interaction around professional issues. According to Margaret Riel, the educational consultant for AT&T's *Learning Network*, teachers who participate in the network's courses (which typically involve seven to ten classrooms in other states and countries in a curriculum-based project) benefit by acquiring new knowledge, learning new instructional strategies, increasing their self-esteem, and developing personal relationships with their peers in remote sites (Riel 1991). An electronic message to the Committee on Telecommunications from a teacher in Hilton, New York, underscored this claim:

> **The Learning Network has also been a wonderful learning experience for this teacher—the ideas, projects, and techniques that one gets from distant colleagues have helped me greatly in my own teaching. The opportunity to work with and share innovative ideas with these talented people would not have been possible without this "electronic teacher's lounge." In addition, I have made many new friends and contacts. (Sandi Norgaard, personal communication, February 3, 1991)**

> CONCLUSION: *Telecommunications technology can be an effective vehicle for professional and staff development.*

Association Issues

Role of the Local Affiliates— The association's responsibility is to support and initiate efforts that enhance the offerings of the curriculum. Such efforts might increase opportunities for students to experience or learn about the latest scientific discoveries; allow students to talk to performers, artists, and political figures; permit access to vast databases; stimulate the development of a global perspective on social and ecological issues; and develop social and technical skills that will be of direct use in the work world of the "global village." American students using telecommunications technologies as part of their regular instruction have benefited in all of the ways discussed above. These additions to the curriculum reflect well on students, on schools, and on teachers and promote a positive image of advances being made in public schools.

Many of these improvements and additions to instruction may also be enhancements of the working conditions of NEA's members. They permit expanded opportunities for creativity, provide new ways of exploring traditional subjects, and enhance the role responsibilities of education employees. In this scenario, the quality of the educational environment is as critical to the quality of work life as those issues ordinarily considered to be working conditions (e.g., duty-free lunch, the number of preparation periods, and so forth). NEA's advocacy in this new frontier must become as vigorous as its advocacy in the traditional area of working conditions.

The association must also protect the rights of its members. Many distance education efforts are not regulated by any contractual provisions, which leaves district administrations free to unilaterally determine appropriate work loads and release time for educators involved in distance education efforts. This can create serious problems for teachers. In the next section, some potential problems are reviewed and appropriate policies designed to keep these problems from developing are recommended.

> Conclusion: *The local association has three fundamental roles with respect to telecommunications technologies: to support efforts to improve the quality of instruction in local schools, to enhance the working conditions of its members, and to protect their rights.*

Role of State Affiliates— Until recently, telecommunications was not considered an integral aspect of education. However, as the transmission of video, voice, and data become a part of the educational process, the regulatory framework of telecommunications will come to have increasing importance for education. A great deal is happening at both the federal and

state levels with respect to telecommunications. Knowledge of the current regulatory environment is critical for the association's ability to advocate for the interests of its members.

> CONCLUSION: *NEA state affiliates should monitor changes in state telecommunications regulations that will affect accessibility and affordability of advanced telecommunications technologies to public schools.*

INFORMING NEA MEMBERS— Since telecommunications technology is a relative newcomer to the classroom, many NEA members are unaware of its current applications as well as its potential to affect their lives and working conditions. NEA's internal publications can play a vital role in educating members about telecommunications issues.

> CONCLUSION: *Existing NEA publications should be used to inform NEA members regarding the impact of proposed amendments to current telecommunications regulations.*

Working Conditions

DISPLACEMENT OF EDUCATIONAL PERSONNEL— Displacement by distance learning networks or other electronic devices remains a serious fear on the part of many NEA members. The committee found no evidence of an interactive telecommunications network displacing NEA members. For the most part, distance education represents one solution to the problems many districts face in trying to provide course offerings when there is only modest demand from students. However, recessionary times could pose an added incentive for school districts to use distance education as a cost-saving vehicle. To ensure that the displacement of teachers by telecommunications networks does not occur at some point in the future, all affiliates must take a firm position on this issue.

> CONCLUSION: *No reduction of positions, hours, or compensation should occur as a direct or indirect result of any telecommunications system.*

PREPARATION TIME FOR TELETEACHERS— There is universal agreement that classes involving interactive telecommunications technology require more time to prepare for than conventional classes. Yet in the case studies commissioned by the Office of Technology Assessment for its *Linking for Learning* report, almost 90 percent of teachers surveyed said they did not receive a reduced teaching load (OTA 1989). Arrangements for preparation time should be negotiable. They could involve extra preparation time during the school day or a free day or portion of a day each week.

CONCLUSION: *Individuals who teach classes over interactive telecommunication networks shall be given sufficient time to prepare for their classes.*

PREPARATION TIME FOR ON-SITE TEACHERS— The delivery of whole courses is not the only area in which time is expended. A great deal of time is required to coordinate projects that require collaboration with distance classrooms. Also, if teachers are using materials from cable networks as part of their instruction, time is needed to preview programs and determine how they might best be used. With digital video compression, many more programs will soon be available for educational purposes. This will increase the time needed to sift through available material for instructional purposes. If teachers are not given time to do this, new materials will most likely not be used to their best advantage in classrooms.

CONCLUSION: *Additional preparation time should be granted to teachers using telecommunications technology to enrich their regular programs.*

CLASS SIZE AND TEACHER LOAD— Class size varies considerably by course and network in distance education. While receiving sites typically do not have more than 10 students, the total size of individual classes (considering all receiving classrooms) ranges from 30 to 400.

Course load also varies considerably from network to network. For example, if a teacher in Shiawasee County or Jackson County, Michigan, teaches a class over an ITV network, that teacher gets his or her course load reduced by only one class. In the case of TI-IN and SERC, however, a full-time course load is only two classes. The number of students varies considerably in these cases. TI-IN teachers teach classes with hundreds of students, while Shiawasee and Jackson ITV classes can contain no more students than is specified in the collective bargaining agreement in force at the originating site. The large size of the TI-IN and SERC classes should not be taken to mean that they take more total time than an ITV class in Jackson County. Large networks almost always provide teachers with support staff, in-class facilitators, and graders when necessary. This has a significant impact on the time requirements of the course. Districts negotiating contract language about class size and load might be profitably guided by the principle of average time required per course as well as the number of students or courses a teacher is required to teach.

Beyond a teacher's time requirements, the local education association must be cognizant of the educational soundness of a course's design. This is particularly true for very large classes

of three or four hundred students. Are there sufficient opportunities for students to interact with the instructor? Are students encouraged to interact with one another within and among receiving sites? Does the course provide opportunities outside of the broadcasts by the teacher for students to interact with experts. For example, SERC provides students in its Japanese class with opportunities to interact with native speakers of Japanese via audioconferencing as part of the course. Students are assigned to groups of no more than ten students for these weekly events. This small group activity deals with the interaction problems that might be caused by the large size of the class. These kinds of concerns must be addressed by local associations in evaluating the educational soundness of individual courses.

> CONCLUSION: *Class size and load should be educationally sound and determined by agreement between the district and local association.*

COMPENSATED TRAINING— Compensated training is one of the issues of most concern to teachers involved in various kinds of distance education projects. It has become an issue in many areas precisely because most project budgets deal only with equipment and do not support activities like training.

> CONCLUSION: *Education employees should receive compensated training provided by the district. If training occurs outside the school year, staff members shall be compensated at their normal hourly rate for time spent in training.*

DISCIPLINE— Student discipline is another area about which many teachers have expressed concern. Teachers in a remote classroom cannot be responsible for the discipline of students removed by many miles. It is important to make this explicit at the outset of a distance education effort.

> CONCLUSION: *The discipline of students at remote sites should be the responsibility of the district at the remote site.*

PROTECTION OF TELETEACHERS— For the most part, a person is liable for negligence only when he or she causes injury to another through violation of some duty imposed upon him or her by law. Although a teacher has a duty to exercise due care with respect to the safety and welfare of his or her students, the duty only arises in those cases in which an injury could have been foreseen and prevented. In the event of an injury to a student in a remote classroom, it is highly unlikely that a teacher in the originating site (who may not even have a video connection to the remote site) could be considered to be in a position to foresee or prevent the injury and therefore cannot be held

liable. The exception to this is if the teacher at the originating site knowingly suggested a dangerous activity to the class (Seitz 1991). Liability issues would be different, of course, for the on-site facilitator, who would be more likely to be in the position to foresee and prevent injury.

Although it is unlikely that a teleteacher would be held liable for negligence, the committee deems it prudent to deal with the issue of potential liability up front and to request that the district assume responsibility for a teleteacher's legal defense. For many NEA members, potential liability stemming from their participation in distance learning activities is a serious issue, and a hold harmless provision may ameliorate this concern.

> CONCLUSION: *Teleteachers should be held harmless from any and all actions, suits, claims, or other forms of liability which arise from their involvement in a telecommunications network. Employers of teleteachers should be obligated to provide a legal defense for them in the event that they are named in a negligence action.*

EVALUATION OF TELETEACHERS— For the first time, distance education projects pose the possibility that teachers' classroom activities could be evaluated without their knowledge. While some networks have two-way video, most rely only on two-way audio to permit interaction among sites. This means that an administrator could walk into a remote classroom and observe the teacher without his or her knowledge. To prevent this from happening, NEA encourages evaluations that are conducted openly. This means that an administrator may still evaluate a teacher from a remote site. (This would be entirely appropriate, given that an individual teacher's effectiveness would have to translate over the screen.) However, the administrator would be required to notify the teacher that he or she will be in the remote site.

> CONCLUSION: *The evaluation of teleteachers should be conducted openly and meet the requirements of the local collective bargaining agreement or evaluation policy.*

Restructuring Issues

TELECOMMUNICATIONS AND INSTRUCTIONAL OPPORTUNITIES— While many of the most visible telecommunications projects simply expand the courses available to students, others like AT&T's *Learning Network* or National Geographic's *Kids Network* actually reconfigure relationships in the traditional classroom. Both the *Learning Network* and the *Kids Network* serve to link classrooms around the country and the world in order to facilitate joint research and writing projects. Through

the use of telecommunications technologies, a single classroom can literally become part of a global learning community. These technologies make it easy for teachers to organize classroom instruction around multifaceted group projects. Teachers serve as coordinators and resources for students collecting information to be shared with other classes on the network. In fact, teachers using telecommunications technology in the classroom experience substantially the same kinds of new roles that the NEA Special Committee on Technology identified in its 1989 report: collaborator, mentor/mentee, planner, researcher, and seeker of new ideas (NEA 1989).

These technologies may facilitate restructuring but do not guarantee that it will occur. Restructuring requires a conscious and committed effort on the part of classroom teachers. In the committee's investigations into telecommunications technology and restructuring, it became clear that it is not necessarily the technical sophistication of the links among classrooms that is critical to change, but the way the links are used. The computer conferencing technology used in the *Learning Network* or the *Kids Network* is not as sophisticated as the fiber optic technology used in other networks. Nevertheless, often fiber optic networks simply allow a class to be taught in the traditional way in several locations at once, whereas less sophisticated technologies such as computer conferencing may allow a class to be taught differently. For restructuring to occur, teachers have to be made aware of the possibilities that are available to them. This awareness can be further reinforced by paid training and time to experiment with the new tools.

> CONCLUSION: *Telecommunications technology should be used to enhance the roles and instructional opportunities of teachers.*

STUDENT LEARNING— When teachers are placed in new roles with respect to their students, the students also have new opportunities open to them in the instructional process. Through the use of joint research and writing projects using multisite links, students have the opportunity to become active learners, collaborating with other students in remote sites to produce something that no one site could produce alone. Telecommunications can promote student roles such as researcher, coordinator, and collaborator.

> CONCLUSION: *Telecommunications technology should be used to support the development of critical thinking and collaboration skills as well as to expand opportunities for students.*

Resources

A Classroom Essential: The Telephone— Teachers are precluded from having even the most rudimentary connections with parents, other classrooms, and the larger community because they do not have phones. Relatively simple applications of telecommunications technology like voice mail (to retrieve and send messages to parents) or computer conferencing are not possible without a phone line into the classroom. Unless this basic need can be met, telecommunications technology will have only a minor role to play in educational reform and improvement.

> Conclusion: *Every classroom should be equipped with a telephone.*

Other Necessary Classroom Resources— The NEA Special Committee on Technology (1989) recommended that "all schools should develop and implement a plan to install a computer with adequate software on every teacher's desk by 1991." Beyond computers, the investigations of the NEA Special Committee on Telecommunications showed that classrooms should also have access to a video display, VCR, and facsimile machine to take full advantage of the emerging world of educational telecommunications.

> Conclusion: *Every classroom should have access to the resources necessary to make full use of telecommunications.*

Consortium for School Networking— In 1991, Congress passed and President Bush signed the High-Performance Computing Act, introduced by Senator Albert Gore, Jr. (D-Tennessee). Among the purposes of the Act are the establishment of a high-capacity national research and education network; expansion of the number of researchers, educators, and students involved with training in high-performance computing; investment in basic research and education; and the improvement of planning and coordination of federal research and development on high-performance computing. However, planning for a high-capacity national network up to this point has generally excluded K-12 schools. The NEA is currently represented on the executive board of the Consortium for School Networking, which is seeking to —

1. Integrate the disparate physical networks and resources into the national networking matrix
2. Increase linkages between K-12 and higher education networking

3. Develop user-friendly interfaces to enable linking between networks
4. Increase participation by the K-12 education community
5. Plan the evolution toward a complete national K-12 network system.

CONCLUSION: *The NEA should support the efforts of the Consortium for School Networking to promote K-12 inclusion in the development of a nationwide fiber optic network backbone.*

Regulatory Issues

NEW OPPORTUNITIES FOR TELECOMMUNICATIONS PROVIDERS—Under the Modification of Final Judgment, the Consent Decree governing the break-up of AT&T, the seven Bell Operating Companies formed in the break-up were restricted from providing long distance telephone service, delivering information services, and manufacturing telecommunications-related products. On July 25, 1991, U.S. District Court Judge Harold Greene removed the restriction on the provision of information services. Several months earlier, the Telecommunications Competition and Manufacturing Act of 1991 (S. 173), which would remove Bell Operating Company restrictions on manufacturing, passed the Senate by a 71-24 vote. A companion piece of legislation (H.R. 1527) is now before the House Energy and Commerce Subcommittee on Telecommunications and Finance.

The Bell Operating Companies have contended that restrictions stemming from the Consent Decree have made it difficult for them to develop and deliver products and services that would be useful for public education. Products might include devices designed to aid the hearing impaired or screen out background noise, and services might include reading programs, tutorials, electronic database services, and automatic translation services delivered over phone lines. These are only examples. The point, however, is that government regulation of the telecommunications industry has functioned to artificially restrict competition among firms and prevent the development and distribution of new products and services (U.S. Department of Commerce 1991).

In addition to stimulating the development of products and services tailored to the existing telecommunications infrastructure, the lifting of restrictions is likely to accelerate the replacement of existing copper cable with a fiber optic network capable of carrying video, voice, and data over one line. This would dramatically expand the capacity of the existing telecommunications infrastructure and allow the development of a

wide range of products and services that cannot be delivered over existing lines. Japan has already made a major commitment in this direction. By the year 2015, Nippon Telephone and Telegraph plans to complete work on an integrated (video, voice, and data) digital broadband network.

After considering all facets of the debate about the removal of restrictions, the committee has concluded that the interests of education would be best served by the absence of anticompetitive restrictions on the Bell Operating Companies regarding the provision of information services or the manufacturing of telecommunications-related products. At the same time, the committee believes that the removal of anticompetitive restrictions should be combined with regulatory safeguards to prevent the Bell Operating Companies from engaging in anticompetitive behaviors or subsidizing nontelephone ventures with revenues from telephone operations.

While the committee endorses a more open, competitive environment, its endorsement should not be construed to indicate support for those telecommunications activities in which schools are used as captive markets for consumer products (such as Whittle Communications's Channel One).

CONCLUSION: *Telecommunications providers should have the opportunity to develop, produce, and distribute products and services relevant to public education.*

The language in this proposed policy position is deliberately general to indicate the committee's endorsement of a more open, competitive environment in the telecommunications industry. The committee expects that the creation of such an environment will produce beneficial results for education.

REDUCED TELEPHONE RATES FOR SCHOOL DISTRICTS— In most states in the United States, school districts are lumped in with private sector institutions and required to pay for telephone service at the corporate rate. Because of their public service function, school districts should be given a more favorable rate that accords with their social mission. While onerous, corporate telephone rates have been tolerable because the vast majority of school employees lack access to a telephone, and telephone use by school employees has been fairly restricted. As more schools provide their employees with telephone service and that service is used more extensively, the rates paid by school districts will present a much more significant problem than they do at present.

CONCLUSION: *The NEA and its affiliates should encourage state legislatures and state public utility commissions to grant school districts reduced rates for telephone service.*

FREE OR LOW COST ACCESS TO TELECOMMUNICATIONS TECHNOLOGY FOR SCHOOLS— The good news is that telecommunications technology is here to stay in public education. The bad news is that many schools and classrooms have little or no access to it. The lack of telephones is only part of the problem. For instance, while electronic databases like CompuServ and Prodigy are virtually ubiquitous, some rural and suburban schools that want to use these databases must pay toll charges because a local access node is not located in their calling region. The toll charges to the schools may be greater than the charges for connecting to the database itself. The high costs discourage teachers and students in toll areas from using the databases to the extent they could if they were charged local rates. This is not something which can be effectively dealt with through federal or state legislation. The location of local access nodes is the decision of the database providers themselves.

CONCLUSION: *The NEA and its affiliates should work with appropriate agencies and organizations to ensure that telecommunications providers and networks offer free or low-cost access to schools and classrooms.*

In another vein, while the majority of American school districts are connected to local cable networks, many cable connections to local school systems are woefully inadequate and require districts to spend thousands of dollars to connect buildings and classrooms if they want to establish a reasonable level of classroom access. Further study is needed to determine why some school systems, schools, and classrooms are deprived of the benefits of educational telecommunications. Such efforts may involve dialogue with telecommunications providers and networks, joint activities with industry groups and other organizations, the dissemination of information to policymakers, and political action. Effective solutions to the access problems are neither readily apparent or simple. They will require research, time, and a concerted, coherent effort on the part of NEA and its affiliates.

CONCLUSION: *The NEA and its affiliates should begin to explore the ways in which schools and classrooms are prevented from receiving the benefits of telecommunications technologies and develop appropriate strategies for dealing with these problems.*

A Concluding Note

Only five years ago, a major report on educational telecommunications would have been interesting, but hardly worth much attention. A great deal has happened in recent years, however. In 1987, Congress enacted the Star Schools program to encourage the development of telecommunications consortia that would provide high-quality programming in mathematics, science, foreign languages, and other subjects on a statewide or interstate basis. Since 1987, about $80 million has been awarded to eligible telecommunications partnerships (Krebs 1991). There are 92 educational networks worldwide at present; most of them are in the United States (Hansell 1991). State involvement in policy and planning is both more comprehensive and commonplace than five years ago. Involvement by private companies in state planning processes and the provision of telecommunications services to education is increasing as well (Hezel 1991). Private vendors offer bulletin boards, online databases, and opportunities for classes to collaborate across district, state, and national boundaries.

Tremendous excitement has been generated among NEA members about the potential of telecommunications for education and their own practice. At the same time, the majority of U.S. classrooms lack access to a telephone and are thus precluded from participating in the Age of Communication. Computer conferencing and dial-up services are likely to become the norm for businesses in the future. If U.S. public schools are to educate people to fully participate in the world which is now emerging, NEA and its affiliates must put their energies and imagination into ensuring equitable access to telecommunications technologies among their members and the students they serve. Only if they succeed in this task will they be able to realize the potential for stimulating innovation and restructuring schools held out by educational telecommunications.

Policy Positions

The Special Committee on Telecommunications recommends that the NEA adopt the following policy positions:

1. Education employees are essential to the success of any telecommunications project.
2. Telecommunications technology is an effective tool to enhance the curriculum and support the restructuring of schools.
3. No one best model exists for the use of telecommunications technology. Schools must choose the system that is most appropriate for them.
4. Telecommunications technology has the capacity to reduce educational inequities within and among schools and school districts.
5. Education employees, including representatives of the local association, must be involved in all aspects of telecommunications projects.
6. Maintenance, technical support, training, evaluation, and staffing, as well as equipment purchases, must be fully funded.
7. Participants in projects involving telecommunications technologies should be recruited on the basis of skills identified as necessary for success as well as seniority. Participation should be voluntary.
8. Standards and policies regarding facilitators in telecommunications projects should be developed by the district and local association.
9. Compensated training should be provided for teachers and facilitators in the use of telecommunications equipment, the development of effective materials, and appropriate instructional strategies.
10. Prospective teachers should receive training in telecommunications technology and the instructional strategies to be employed in its use.
11. Telecommunications technology can be an effective vehicle for professional and staff development.
12. The local association has three fundamental roles with respect to telecommunications technologies: to support efforts to improve the quality of instruction in local schools, to enhance the working conditions of its members, and to protect their rights.
13. No reduction of positions, hours, or compensation should occur as a direct or indirect result of any

telecommunications system.

14. Individuals who teach classes over interactive telecommunication networks should be given sufficient time to prepare for their classes.
15. Additional preparation time should be granted to teachers using telecommunications technology to enrich their regular programs.
16. Class size and load should be educationally sound and determined by agreement between the district and local association.
17. Education employees should receive compensated training provided by the district. If training occurs outside the school year, staff members should be compensated at their normal hourly rate for time spent in training.
18. The discipline of students at remote sites should be the responsibility of the district at the remote site.
19. Teleteachers should be held harmless from any and all actions, suits, claims, or other forms of liability which arise from their involvement in a telecommunications network. Employers of teleteachers should be obligated to provide a legal defense for them in the event that they are named in a negligence action.
20. The evaluation of teleteachers should be conducted openly and meet the requirements of the local collective bargaining agreement or evaluation policy.
21. Telecommunications technology should be used to enhance the roles and instructional opportunities of teachers.
22. Telecommunications technology should be used to support the development of critical thinking and collaboration skills as well as to expand opportunities for students.
23. Every classroom should be equipped with a telephone.
24. Every classroom should have access to the resources necessary to make full use of telecommunications.
25. Telecommunications providers should have the opportunity to develop, produce, and distribute products and services relevant to public education.

Action Recommendations

1. That NEA encourage the development of public and private funding to allow schools to purchase, maintain, and upgrade telecommunications systems and connections.
2. That states be encouraged to develop specific policies for licensing teachers involved in distance education.
3. That NEA state affiliates monitor changes in state telecommunications regulations that will affect accessibility and affordability of advanced telecommunications technologies to public schools.
4. That existing NEA publications be used to inform NEA members regarding the impact of proposed amendments to current telecommunications regulations.
5. That the NEA support the efforts of the Consortium for School Networking to promote K-12 inclusion in the development of a nationwide fiber optic network backbone.
6. That the NEA and its affiliates encourage state legislatures and state public utility commissions to grant school districts reduced rates for telephone service.
7. That the NEA and its affiliates work with appropriate agencies and organizations to ensure that telecommunications providers and networks offer free or low-cost access to schools and classrooms.
8. That the NEA and its affiliates begin to explore the ways in which schools and classrooms are prevented from receiving the benefits of telecommunications technologies and develop appropriate strategies for dealing with these problems.

References

Ahern, Barbara. 1991. Presentation to Telecon XI, San Jose, California, Nov. 13-15.

Ashford, Ellie. 1990. Three New Satellite Proposals Float. *School Board News*, Oct. 9, 1.

Bocke, Cynthia. 1991. Highways in the Sky. *Via Satellite*, Dec.

Communications Daily. 1990. Education Interest Piqued by DBS Plan. *Communications Daily*, Nov. 14, 3-5.

Cuban, Larry. 1986. *Teachers and Machines: The Classroom Use of Technology since 1920.* New York: Teachers College Press.

Daley, Alan. 1991a. Presentation to the NEA Special Committee on Telecommunications, Washington, D.C., April 15-16.

_____. 1991b. Broadband Networks: Bringing the Information Age into Schools. *Tech Trends* 36 (2): 13-17.

Garner, Daniel. 1991. Presentation to the NEA Special Committee on Telecommunications, Washington, D.C., April 15-16.

Gilcher, Kay, and Sally Johnstone. 1988. *A Critical Review of the Use of Audiographic Conferencing Systems by Selected Educational Institutions*. College Park, Maryland: International University Consortium, University of Maryland.

Graham, Ellen. 1991. "Distance Education" Uses Electronic Links to Recast the Campus. *Wall St. Journal*, Sept. 13.

Hansell, Kathleen. 1991. Presentation to Telecon XI, San Jose, California, November 13-15.

The Heller Report. 1991. Array of Channels Planned by ACC. *The Heller Report* 2 (4): 1, 6-7.

Hezel, Richard T. 1991. Statewide Planning for Telecommunications in Education: Some Trends and Issues. *Tech Trends* 36 (5): 17-20

Jones, Glenn R. 1991. *Make All America a School: Mind Extension University*. 2d ed. Englewood, Colorado: Jones 21st Century.

Krebs, Arlene. 1991. *The USDLA Funding Sourcebook for Distance Learning and Educational Technology*. Tustin, California: Technological Horizons in Education Journal.

National Education Association (NEA), Special Committee on Technology. 1989. *Educational Technology: NEA Special Committee Report*. Washington, D.C.: NEA.

The National Foundation for the Improvement of Education. 1990. *Images in Action*. Washington, D.C.: NFIE.

Northern Telecom Education Systems. 1991. *Distance Learning Using Digital Fiber Optics*. Richardson, Texas: Northern Telecom.

Office of Technology Assessment (OTA), U.S. Congress. 1989. *Linking for Learning: A New Course for Education*. Washington, D.C.: U.S. Government Printing Office.

Riel, Margaret. 1991. Presentation to the NEA Special Committee on Telecommunications, Washington, D.C., Feb. 6-7.

Roberts, Linda. 1991. Presentation to the NEA Special Committee on Telecommunications, Washington, D.C., January 17-18.

Schiller, Scott, and Barbara J. Noll. 1991. Utilizing Distance Learning in a Large Urban School System. *Tech Trends* 36(1): 23-27.

Seitz, Virginia. 1991. Memorandum to John Yrchik, December 4.

Tech Trends. 1991. Interview with Lloyd Otterman. *Tech Trends* 36(1): 18-22.

U.S. Dept. of Commerce, National Telecommunications and Information Administration. 1991. *The NTIA Infrastructure Report: Telecommunications in the Age of Information*. Washington, D.C.: U.S. Dept. of Commerce.

Welch, Sandra. 1991. Presentation to the NEA Special Committee on Telecommunications, Washington, D.C., April 15-16.

West, Peter. 1990. 2 Proponents of Satellite for Education Present Their Cases to President Bush. *Education Week*, Oct. 3.

Appendix
Presenters

Debra Berlyn	National Association of State Utility Consumer Advocates
Alan Daley	Bell Atlantic
Don Dement	Advanced Communications Corporation
Scott Finer	Advanced Communications Corporation
Mary Gardiner Jones	Alliance for Public Technology
Daniel Garner	Advanced Communications Corporation
Kay Gilcher	University of Maryland
Lyle Hamilton	NEA Broadcast Services
Joan Katz	Public Broadcasting Services
Sassie Miles	Prince George's County Schools
Inabeth Miller	Massachusetts Corporation for Educational Communications
Pamela Pease	TI-IN
Margaret Reil	AT&T Learning Center
Linda Roberts	Office of Technology Assessment
Scott Schiller	Prince George's County Schools
Earl Stoner	Discovery Channel
Tom Taylor	Michigan Education Association
Gary Watts	NEA National Center for Innovation in Education
Laird Walker	US West
Shelly Weinstein	EDSAT
Sandra H. Welch	Public Broadcasting Services
Frank Withrow	U.S. Department of Education

Committee Members

E. Scott Brown,
chairperson
Math Teacher *(secondary)*
2177 Rebecca Drive
Hatfield, PA 19440

Kathy Bell
Media Specialist *(secondary)*
NEA Executive Committee Member
12266 Oak St.
Largo, FL 34644

Paul Coppens
Librarian *(higher education)*
Head, Media Services
129 Shore Drive
Nashua, NH 03062

Jane M. Jensen
English Literature Teacher *(secondary)*
NEA Board Member
43 Belleview Avenue
Rutland, VT 05701

Joanne E. Lautenschlager
Math Teacher *(secondary)*
813 20th Street, N.W
Minot, ND 58701

Karen Scott
Chair, Foreign Languages *(secondary)*
P.O. Box 2334
Staunton, VA 24401

ElDoris Turner
Reading Specialist *(elementary)*
9332 37th Avenue South
Seattle, WA 98118

Keith Zook
Technology Coordinator *(secondary)*
23270 East River Road
Grosse Ile, MI 48138

STAFF LIAISON:

Ron Henderson

Staff:

Bronwyn Goad
Janet Keyser
Carol Norman
John Yrchik

NATIONAL
EDUCATION
ASSOCIATION

1201 16th Street, NW
Washington, DC 20036